

# SEQUENCE LISTING

<110> Fischhoff, et al.

<120> SYNTHETIC PLANT GENES AND METHOD FOR PREPARATION

<130> 28079/41786

<140> US 08/434,105

<141> 1995-05-03

<150> US 07/959,506

<151> 1992-10-09

<150> US 07/476,661

<151> 1990-02-12

<150> US 07/315,355

<151> 1989-02-24

<160> 40

<170> PatentIn version 3.3

<210> 1

<211> 1743

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic nucleotide sequence encoding Btk HD-1 insecticidal protein (cry1Ab), described in Example 1, and set forth in the lower line of Figure 2

<400> 1

atggctatag aaactgggta caccccaatc gatatttcct tgctcgtaac gcaatttctt	60
ttgagtgaat ttgttcccg tgctggattt gtgttaggac tagttgatat tatctgggga	120
atTTTTggtc cctctcaatg ggacgcattt cttgtacaaa ttgaacagct catcaaccag	180
agaatcgaag agttcgctag gaatcaagcc atttctagat tagaaggact aagcaatctt	240
tatcaaattt acgcagaatc ttttagagag tgggaagcag atcctactaa tccagcatta	300
agagaagaga tgcgtattca attcaatgac atgaacagtg cccttacaac cgctatttct	360
ctttttgcag ttcaaaatta tcaagtttct ctctctccg tgtacgttca agctgccaac	420
ctccacctct cagttttgag agatgtttca gtgtttggac aaaggtgggg atttgatgcc	480
gcgactatca atagtcgtta taatgattta actaggctta ttggcaacta tacagatcat	540
gctgtacgct ggtacaatac gggattagag cgtgtatggg gaccggattc tagagattgg	600
atcaggtaca accagttcag aagagagctt acactaactg tattagatat cgtttctcta	660
tttccgaact atgatagtag aacgtatcca attcgaacag tttcccaatt aacaagagaa	720
atTTatacaa acccagtatt agaaaatttt gatggtagtt ttcgaggctc ggctcagggc	780
atagaaggaa gtattaggag tccacatttg atggatatac ttaatagtat aaccatctat	840

acggatgctc atagaggaga atactactgg tccggtcacc agatcatggc ttctcctgta	900
gggttttcgg ggccagaatt cacttttccg ctatatggaa ctatgggaaa tgcagctcca	960
caacaacgta ttgttgctca actaggtcag ggcgtgtata gaacattatc gtccacctta	1020
tatagaagac cttttaacat cgggatcaac aaccaacaac tatctgttct tgacgggaca	1080
gaatttgctt atggaacctc ctcaaatttg ccatccgctg tatacagaaa aagcggaacg	1140
gtagattcgc tggatgaaat accgccacag aataacaacg tgccacctag gcaaggattt	1200
agtcatcgat taagccatgt ttcaatgttt cgttcaggct ttagtaatag tagtgtaagt	1260
ataataagag ctcttatgtt ctcttgata catcgtagt ctgagttcaa caacatcatc	1320
ccttcatcac aaatcaccca aatcccactc accaagtcta ctaatcttgg ctctggaact	1380
tctgtcgtta aaggaccagg atttacagga ggagatattc ttcgaagaac ttcacctggc	1440
cagatttcaa ccttaagagt aaatattact gcaccattat cacaagata tcgggtaaga	1500
attcgctacg cttctaccac aaaccttcag ttccacacat caattgacgg aagacctatt	1560
aatcagggga atttttcagc aactatgagt agtgggagta atttacagtc cggaagcttt	1620
aggactgtag gttttactac tccgtttaac ttttcaaagt gatcaagtgt atttacgtta	1680
agtgtcatg tcttcaattc aggcaatgaa gtttatatag atcgaattga atttgttccg	1740
gca	1743

<210> 2  
 <211> 1743  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Native Btk HD-1 nucleotide sequence encoding Btk HD-1 toxin protein (Cry1Ab) from amino acid 29-607 as described in Example 1 & set forth in the upper line of Figure 2, & includes synthetic sequence encoding N-terminal Met-Ala

<400> 2	
atggctatag aaactgggta caccccaatc gatatttcct tgctgctaac gcaatttctt	60
ttgagtgaat ttgttcccg tgetggattt gtgttaggac tagttgatat aatatgggga	120
atttttggtc cctctcaatg ggacgcattt cttgtacaaa ttgaacagtt aattaaccaa	180
agaatagaag aattcgctag gaaccaagcc atttctagat tagaaggact aagcaatctt	240
tatcaaattt acgcagaatc ttttagagag tgggaagcag atcctactaa tccagcatta	300
agagaagaga tgcgtattca attcaatgac atgaacagtg cccttacaac cgctattcct	360
ctttttgcag ttcaaaatta tcaagttcct cttttatcag tatatgttca agctgcaa	420
ttacatttat cagttttgag agatgtttca gtgtttggac aaaggtgggg atttgatgcc	480
gcgactatca atagtcgtta taatgattta actaggctta ttggcaacta tacagatcat	540

gctgtacgct ggtacaatac gggattagag cgtgtatggg gaccggattc tagagattgg	600
ataagatata atcaatttag aagagaatta acactaactg tattagatat cgtttctcta	660
tttccgaact atgatagtag aacgtatcca attcgaacag tttcccaatt aacaagagaa	720
atattatacaa acccagtatt agaaaatddd gatggtagtt ttcgaggctc ggctcagggc	780
atagaaggaa gtattaggag tccacatttg atggatatac ttaatagtat aaccatctat	840
acggatgctc atagaggaga atattattgg tcagggcatc aaataatggc ttctcctgta	900
gggttttcgg ggccagaatt cacttttccg ctatatggaa ctatgggaaa tgcagctcca	960
caacaacgta ttgttgctca actaggctcag ggcgtgtata gaacattatc gtccacctta	1020
tatagaagac cttttaatat agggataaat aatcaacaac tatctgttct tgacgggaca	1080
gaatttgctt atgggaacctc ctcaaatttg ccatccgctg tatacagaaa aagcggaaacg	1140
gtagattcgc tggatgaaat accgccacag aataacaacg tgccacctag gcaaggattt	1200
agtcatcgat taagccatgt ttcaatgttt cgttcaggct ttagtaatag tagtgtaagt	1260
ataataagag ctccatgtt ctcttgata catcgtagtg ctgaatttaa taatataatt	1320
ccttcacac aaattacaca aataccttta acaaaatcta ctaatcttg ctctggaact	1380
tctgtcgta aaggaccagg atttacagga ggagatattc ttcgaagaac ttcacctggc	1440
cagatttcaa ccttaagagt aaatattact gcaccattat cacaagata tcgggtaaga	1500
attcgctacg cttctaccac aaatttaca ttccatacat caattgacgg aagacctatt	1560
aatcagggga atttttcagc aactatgagt agtgggagta atttacagtc cggaagcttt	1620
aggactgtag gttttactac tccgtttaac ttttcaaag gatcaagtgt atttacgtta	1680
agtgtcatg tcttcaattc aggcaatgaa gtttatatag atcgaattga atttgttccg	1740
gca	1743

<210> 3  
 <211> 1845  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence encoding Btk HD-1 insecticidal toxin protein  
 (Cry1Ab), described in Example 2, and set forth in the lower line of  
 Figure 3

<400> 3	
atggacaaca acccaaacat caacgaatgc attccataca actgcttgag taaccagaa	60
gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatcga catctccttg	120
tccttgacac agtttctgct cagcgagtgc gtgccagggtg ctgggttcgt tctcggacta	180
gttgacatca tctgggggat ctttggtcca tctcaatggg atgcattcct ggtgcaaatt	240
gagcagttga tcaaccagag gatcgaagag ttcgccagga accaggccat ctctaggttg	300

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gaaggattga gcaatctcta ccaaattctat gcagagagct tcagagagtg ggaagccgat      360
cctactaacc cagctctccg cgaggaaatg cgtattcaat tcaacgacat gaacagcgcc      420
ttgaccacag ctatcccatt gttcgcagtc cagaactacc aagttcctct cttgtccgtg      480
tacgttcaag cagctaattc tcacctcagc gtgcttcgag acgttagcgt gtttgggcaa      540
aggtgggggat tcgatgctgc aaccatcaat agccgttaca acgaccttac taggctgatt      600
ggaaactaca ccgaccacgc tgttcgttgg tacaacactg gcttggagcg tgtctggggg      660
cctgattcta gagattggat tagatacaac cagttcagga gagaattgac cctcacagtt      720
ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagtg      780
tcccactta ccagagaaat ctatactaac ccagttcttg agaacttcga cggtagcttc      840
cgtggttctg cccaaggtat cgaaggctcc atcaggagcc cacacttgat ggacatcttg      900
aacagcataa ctatctacac cgatgctcac agaggagagt attactgggc tggacaccag      960
atcatggcct ctccagttgg attcagcggg cccgagttta cctttcctct ctatggaact     1020
atgggaaacg ccgctccaca acaacgtatc gttgctcaac taggtcaggg tgtctacaga     1080
accttgtctt ccaccttgta cagaagaccc ttcaatatcg gtatcaacaa ccagcaactt     1140
tccgttcttg acggaacaga gttcgcctat ggaacctctt ctaacttgcc atccgctgtt     1200
tacagaaaga gcggaaccgt tgattccttg gacgaaatcc caccacagaa caacaatgtg     1260
ccaccagggc aaggattctc ccacaggttg agccacgtgt ccatgttccg ttccggattc     1320
agcaacagtt ccgtgagcat catcagagct cctatgttct catggattca tcgtagtgtc     1380
gagttcaaca atatcattcc ttctctctcaa atcacccaaa tcccattgac caagtctact     1440
aaccttggat ctggaacttc tgtcgtgaaa ggaccaggct tcacaggagg tgatattctt     1500
agaagaactt ctctggcca gattagcacc ctcagagtta acatcactgc accactttct     1560
caaagatata gtgtcaggat tcgttacgca tctaccacta acttgcaatt ccacacctcc     1620
atcgacggaa ggcctatcaa tcagggtaac ttctccgcaa ccatgtcaag cggcagcaac     1680
ttgcaatccg gcagcttcag aaccgtcggg ttactactc ctttcaactt ctctaacgga     1740
tcaagcgttt tcacccttag cgctcatgtg ttcaattctg gcaatgaagt gtacattgac     1800
cgtattgagt ttgtgcctgc cgaagttacc ttcgaggctg agtac                       1845

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<210> 4

<211> 1845

<212> DNA

<213> Artificial sequence

<220>

<223> Native Btk HD1 nucleotide sequence encoding Btk HD-1 insecticidal toxin protein (Cry1Ab), described in Example 2, and set forth in the upper line of Figure 3

<400> 4

atggataaca atccgaacat caatgaatgc attccttata attgtttaag taaccctgaa	60
gtagaagtat taggtggaga aagaatagaa actgggttaca cccaatcga tatttccttg	120
tcgctaacgc aatttcctttt gagtgaattt gttcccggtg ctggatttgt gttaggacta	180
gttgatataa tatggggaat ttttggtccc tctcaatggg acgcatttct tgtacaaatt	240
gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta	300
gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat	360
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc	420
cttacaaccg ctattcctct ttttgcagtt caaaattatc aagttcctct tttatcagta	480
tatgttcaag ctgcaaattt acatttatca gttttgagag atgtttcagt gtttggacaa	540
aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt	600
ggcaactata cagatcatgc tgtacgctgg tacaatacgg gattagagcg tgtatgggga	660
ccggattcta gagattggat aagatataat caatttagaa gagaattaac actaactgta	720
ttagatatcg tttctctatt tccgaactat gatagtagaa cgtatccaat tcgaacagtt	780
tcccaattaa caagagaaat ttatacaaac ccagtattag aaaattttga tggtagtttt	840
cgaggctcgg ctcagggcat agaaggaagt attaggagtc cacatttgat ggatatactt	900
aatagtataa ccatctatac ggatgctcat agaggagaat attattggtc agggcatcaa	960
ataatggctt ctctcttagg gttttcgggg ccagaattca cttttccgct atatggaact	1020
atgggaaatg cagctccaca acaacgtatt gttgctcaac taggtcaggg cgtgtataga	1080
acattatcgt ccaccttata tagaagacct ttaatatag ggataaataa tcaacaacta	1140
tctgttcttg acgggacaga atttgcttat ggaacctcct caaatttgcc atccgctgta	1200
tacagaaaaa gcggaacggt agattcgctg gatgaaatac cgccacagaa taacaacgtg	1260
ccacctaggc aaggatttag tcatcgatta agccatgttt caatgtttcg ttcaggcttt	1320
agtaatagta gtgtaagtat aataagagct cctatgttct cttggatata tcgtagtgct	1380
gaatttaata atataattcc ttcacacaaa attacacaaa tacctttaac aaaatctact	1440
aatcttggct ctggaacttc tgtcgttaaa ggaccaggat ttacaggagg agatattctt	1500
cgaagaactt cacctggcca gatttcaacc ttaagagtaa atattactgc accattatca	1560
caaagatatc gggtaagaat tcgctacgct tctaccacaa atttacaatt ccatacatca	1620
attgacggaa gacctattaa tcaggggaat ttttcagcaa ctatgagtag tgggagtaat	1680
ttacagtccg gaagcttttag gactgtaggt ttactactc cgtttaactt ttcaaatgga	1740
tcaagtgtat ttacgttaag tgctcatgct ttcaattcag gcaatgaagt ttatatagat	1800
cgaattgaat ttgttccggc agaagtaacc tttgaggcag aatat	1845

<210> 5  
 <211> 1921  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic hybrid of first 1360 bases synthetic HD-1 linked to  
 modified HD-73 sequence, described in paragraph bridging pages 53-  
 54, and as set forth in the lower line of Figure 4  
  
 <400> 5  
 atggacaaca acccaaacat caacgaatgc attccataca actgcttgag taaccagaa 60  
 gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatcga catctccttg 120  
 tccttgacac agtttctgct cagcgagttc gtgccagggtg ctgggttcgt tctcggacta 180  
 gttgacatca tctggggtat ctttgggtcca tctcaatggg atgcattcct ggtgcaaatt 240  
 gagcagttga tcaaccagag gatcgaagag ttgccaggga accaggccat ctctaggttg 300  
 gaaggattga gcaatctcta ccaaattctat gcagagagct tcagagagtg ggaagccgat 360  
 cctactaacc cagctctccg cgaggaaatg cgtattcaat tcaacgacat gaacagcgcc 420  
 ttgaccacag ctatcccatt gttcgcagtc cagaactacc aagttcctct cttgtccgtg 480  
 tacgttcaag cagctaattct tcacctcagc gtgcttcgag acgttagcgt gtttgggcaa 540  
 aggtggggat tcgatgctgc aaccatcaat agccgttaca acgaccttac taggctgatt 600  
 ggaaactaca ccgaccacgc tgttcgttgg tacaacactg gcttggagcg tgtctggggt 660  
 cctgattcta gagattggat tagatacaac cagttcagga gagaattgac cctcacagtt 720  
 ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagtg 780  
 tcccaactta ccagagaaat ctatactaac ccagttcttg agaacttcga cggtagcttc 840  
 cgtggttctg cccaaggat cgaaggctcc atcaggagcc cacacttgat ggacatcttg 900  
 aacagcataa ctatctacac cgatgctcac agaggagagt attactgggtc tggacaccag 960  
 atcatggcct ctccagttgg attcagcggg cccgagttta cctttcctct ctatggaact 1020  
 atgggaaacg ccgctccaca acaacgtatc gttgctcaac taggtcagggtg tgtctacaga 1080  
 accttgtctt ccaccttgta cagaagaccc ttcaatatcg gtatcaacaa ccagcaactt 1140  
 tccgttcttg acggaacaga gttgcctat ggaacctctt ctaacttgcc atccgctgtt 1200  
 tacagaaaga gcggaaccgt tgattccttg gacgaaatcc caccacagaa caacaatgtg 1260  
 ccaccaggc aaggattctc ccacagggtg agccacgtgt ccatgttccg ttccggttc 1320  
 agcaacagtt ccgtgagcat catcagagct cctatgttct cttggatata ccgtagtgct 1380  
 gagttcaaca acatcatcgc atccgatagt attactcaaa tccctgcagt gaagggaaac 1440  
 tttctcttca acggttctgt catttcagga ccaggattca ctgggtggaga cctcggttaga 1500  
 ctcaacagca gtggaaataa cattcagaat agagggtata ttgaagttcc aattcacttc 1560

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ccatccacat ctaccagata tagagttcgt gtgaggatg cttctgtgac ccctattcac 1620
ctcaacgtta attggggtaa ttcattccatc ttctccaata cagttccagc tacagctacc 1680
tccttgata atctccaatc cagcgatttc gggtactttg aaagtgccaa tgcttttaca 1740
tcttcaactcg gtaacatcgt ggggtgtaga aacttttagtg ggactgcagg agtgattatc 1800
gacagattcg agttcattcc agttactgca acactcgagg ctgaatataa tctggaaaga 1860
gcgcagaagg cggtaatgcg ctgtttacgt ctacaaacca gcttggaactc aagacaaatg 1920
g 1921

```

```

<210> 6
<211> 1921
<212> DNA
<213> Artificial sequence

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<220>
<223> Native Bt nucleotide sequence encoding N-terminal 450 HD-1 (Cry1Ab)
      amino acids and 451-615 of Bkt HD73 (Cry1Ac) described in Example 3
      and as set forth in the upper line of Figure 4

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```

<400> 6
atggataaca atccgaacat caatgaatgc attccttata attgtttaag taaccctgaa 60
gtagaagtat taggtggaga aagaatagaa actgggttaca cccaatcga tatttccttg 120
tcgctaacgc aattttctttt gagtgaattt gttccccgtg ctggatttgt gttaggacta 180
gttgatataa tatggggaat ttttggtccc tctcaatggg acgcatttct tgtacaaatt 240
gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta 300
gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat 360
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc 420
cttacaaccg ctattcctct ttttgagtt caaaattatc aagttcctct tttatcagta 480
tatgttcaag ctgcaaattt acatttatca gttttgagag atgtttcagt gtttggacaa 540
aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt 600
ggcaactata cagatcatgc tgtacgctgg tacaatacgg gattagagcg tgtatgggga 660
ccggattcta gagattggat aagatataat caatttagaa gagaattaac actaactgta 720
ttagatatcg tttctctatt tccgaactat gatagtagaa cgtatccaat tcgaacagtt 780
tccaattaa caagagaaat ttatacaaac ccagtattag aaaattttga tggtagtttt 840
cgaggctcgg ctgagggcat agaaggaagt attaggagtc cacatttgat ggatatactt 900
aatagtataa ccatctatac ggatgctcat agaggagaat attattgggc agggcatcaa 960
ataatggctt ctctgtagg gttttcgggg ccagaattca cttttccgct atatggaact 1020
atgggaaatg cagctccaca acaacgtatt gttgctcaac taggtcaggg cgtgtataga 1080
acattatcgt ccaccttata tagaagacct tttaatatag ggataaataa tcaacaacta 1140

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tctgttcttg acgggacaga atttgcttat ggaacctcct caaatttgcc atccgctgta	1200
tacagaaaaa gcggaacggt agattcgctg gatgaaatac cgccacagaa taacaacgtg	1260
ccacctaggc aaggatttag tcatcgatta agccatgttt caatgtttcg ttcaggcttt	1320
agtaatagta gtgtaagtat aataagagct cctatgttct cttggataca tcgtagtgct	1380
gaatttaata atataattgc atcggatagt attactcaaa tcctgcagt gaagggaaac	1440
tttcttttta atggttctgt aatttcagga ccaggattta ctggtgggga cttagttaga	1500
ttaaatagta gtggaaataa cattcagaat agagggata ttgaagttcc aattcacttc	1560
ccatcgacat ctaccagata tcgagttcgt gtacggtatg cttctgtaac cccgattcac	1620
ctcaacgtta attggggtaa ttcattccatt tttccaata cagtaccagc tacagctacg	1680
tcattagata atctacaatc aagtgtttt ggttattttg aaagtgccaa tgcttttaca	1740
tcttcattag gtaatatagt aggtgttaga aatttttagtg ggactgcagg agtgataata	1800
gacagatttg aatttattcc agttactgca acactcgagg ctgaatataa tctggaaaga	1860
gcgagaagg cggtgaatgc gctgtttacg tctacaaacc aactagggt aaaaacaaat	1920
g	1921

<210> 7  
 <211> 1767  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Truncated synthetic sequence encoding a hybrid Btk HD73 (Cry1Ac) from amino acid 29-615 and including codons encoding N-terminal MET-ALA as described in Example 3 and set forth in the lower line of Figure 8

<400> 7	
atggccattg aaaccgggta cactcccatc gacatctcct tgctcctgac acagtttctg	60
ctcagcgagt tcgtgccagg tgctgggttc gttctcggac tagttgacat catctgggggt	120
atctttggtc catctcaatg ggatgcattc ctggtgcaaa ttgagcagtt gatcaaccag	180
aggatcgaag agttcgccag gaaccaggcc atctctaggt tggaaggatt gagcaatctc	240
taccaaactc atgcagagag cttcagagag tgggaagccg atcctactaa cccagctctc	300
cgcgaggaaa tgcgtattca attcaacgac atgaacagcg ctttgaccac agctatccca	360
ttgttcgcag tccagaacta ccaagttcct ctcttgctcg tgtacgttca agcagctaat	420
cttcacctca gcgtgcttcg agacgttagc gtgtttgggc aaaggtgggg attcgatgct	480
gcaaccatca atagccgtta caacgacctt actaggctga ttggaaacta caccgaccac	540
gctgttcgtt ggtacaacac tggttgagg cgtgtctggg gtcttgatgc tagagattgg	600
attagatata accagttcag gagagaattg accctcacag ttttgacat tgtgtctctc	660



ttcccgaact atgactccag aacctaccct atccgtacag tgtcccgaact taccagagaa	720
atctatacta acccagttct tgagaacttc gacggtagct tccgtgggtc tgcccaaggt	780
atcgaaggct ccatcaggag cccacacttg atggacatct tgaacagcat aactatctac	840
accgatgctc acagaggaga gtattactgg tctggacacc agatcatggc ctctccagtt	900
ggattcagcg ggcccagagtt tacctttcct ctctatggaa ctatgggaaa cgccgctcca	960
caacaacgta tcgttgctca actaggtcag ggtgtctaca gaaccttgct tccaccttg	1020
tacagaagac ccttcaatat cggatatcaac aaccagcaac tttccgttct tgacggaaca	1080
gagttcgctt atggaacctc ttctaacttg ccatccgctg tttacagaaa gacggaacc	1140
gttgattcct tggacgaaat cccaccacag aacaacaatg tgccaccag gcaaggattc	1200
tcccacaggt tgagccacgt gtccatgttc cgttccggat tcagcaacag ttccgtgagc	1260
atcatcagag ctctatgtt ctcttgata caccgtagtg ctgagttcaa caacatcatc	1320
gcatccgata gtattactca aatccctgca gtgaaggga actttctctt caacggttct	1380
gtcatttcag gaccaggatt cactgggtga gacctcgta gactcaacag cagtggaaat	1440
aacattcaga atagagggtt tattgaagtt ccaattcact tccatccac atctaccaga	1500
tatagagttc gtgtgaggtt tgcttctgtg acccctattc acctcaacgt taattggggt	1560
aattcatcca tcttctccaa tacagttcca gctacagcta cctccttgga taatctccaa	1620
tccagcgatt tcggttactt tgaaagtgcc aatgctttta catcttcact cggtaacatc	1680
gtgggtgtta gaaactttag tgggactgca ggagtgatta tcgacagatt cgagttcatt	1740
ccagttactg caacactcga ggctgag	1767

<210> 8  
 <211> 1767  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Native Bt sequence encoding hybrid Btk HD-73 (Cry1Ac), described  
 in Example 3 and set forth in the upper line of Figure 8

<400> 8	
gaaagaatag aaactgggtt caccccaatc gatatttcct tgtcgctaac gcaatttctt	60
ttgagtgaat ttgttcccg tgctggattt gtgttaggac tagttgatat aatatgggga	120
atttttggtc cctctcaatg ggacgcattt cttgtacaaa ttgaacagtt aattaaccaa	180
agaatagaag aattcgctag gaaccaagcc atttctagat tagaaggact aagcaatctt	240
tatcaaattt acgcagaatc ttttagagag tgggaagcag atcctactaa tccagcatta	300
agagaagaga tgcgtattca attcaatgac atgaacagtg cccttacaac cgctattcct	360
ctttttgcag ttcaaaatta tcaagttcct cttttatcag tatatgttca agctgcaa	420

```

ttacatztat cagttttgag agatgtttca gtgtttggac aaaggtgggg atttgatgcc 480
gcgactatca atagtcgtta taatgattta actaggctta ttggcaacta tacagatcat 540
gctgtacgct ggtacaatac gggattagag cgtgtatggg gaccggattc tagagattgg 600
ataagatata atcaatttag aagagaatta aactaactg tattagatat cgtttctcta 660
tttccgaact atgatagtag aacgtatcca attcgaacag tttcccaatt aacaagagaa 720
atztatatac acccagtatt agaaaatttt gatggtagtt ttcgaggctc ggctcagggc 780
atagaaggaa gtattaggag tccacatttg atggatatac ttaatagtat aaccatctat 840
acggatgctc atagaggaga atattattgg tcagggcatc aaataatggc ttctcctgta 900
gggttttcgg ggccagaatt cacttttccg ctatatggaa ctatgggaaa tgcagctcca 960
caacaacgta ttgttgctca actaggctcag ggcggtgata gaacattatc gtccacctta 1020
tatagaagac cttttaatat agggataaat aatcaacaac tatctgttct tgacgggaca 1080
gaatttgctt atggaacctc ctcaaatttg ccatccgctg tatacagaaa aagcggaaacg 1140
gtagattcgc tggatgaaat accgccacag aataacaacg tgccacctag gcaaggattt 1200
agtcatcgat taagccatgt ttcaatgttt cgttcaggct ttagtaatag tagtgtaagt 1260
ataataagag ctctatgtt ctcttgata catcgtagtg ctgaatttaa taatataatt 1320
gcatcgata gtattactca aatccctgca gtgaaggga actttctttt taatggttct 1380
gtaatttcag gaccaggatt tactggtggg gacttagtta gattaaatag tagtggaat 1440
aacattcaga atagagggtta tattgaagtt ccaattcact tcccatcgac atctaccaga 1500
tatcgagttc gtgtacggta tgcttctgta accccgattc acctcaacgt taattgggggt 1560
aattcatcca ttttttccaa tacagtacca gctacageta cgtcattaga taatctatac 1620
tcaagtgatt ttggttattt tgaaagtgcc aatgctttta catcttcatt aggtaatata 1680
gtaggtgtta gaaatttttag tgggactgca ggagtgataa tagacagatt tgaatttatt 1740
ccagttactg caacactcga ggctgaa 1767

```

<210> 9

<211> 3534

<212> DNA

<213> Artificial sequence

<220>

<223> synthetic/wild-type full length sequence encoding HD-73(Cry1Ac),  
1st 1845 nucleotides set forth lower line Fig 4, 1846-end is  
native sequence encoding C-terminus of HD73, described in Ex 3, set  
forth in the lower line of Figure 9

<400> 9

```

atggacaaca acccaaacat caacgaatgc attccatata actgcttgag taaccagaa 60

```

gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatcga catctccttg	120
tccttgacac agtttctgct cagcgagttc gtgccaggtg ctgggttcgt tctcggacta	180
gttgacatca tctgggggat ctttgggtcca tctcaatggg atgcattcct ggtgcaaatt	240
gagcagttga tcaaccagag gatcgaagag ttcgccagga accaggccat ctctaggttg	300
gaaggattga gcaatctcta ccaaacttat gcagagagct tcagagagtg ggaagccgat	360
cctactaacc cagctctcgg cgaggaaatg cgtattcaat tcaacgacat gaacagcgcc	420
ttgaccacag ctatccatt gttcgcagtc cagaactacc aagttcctct cttgtccgtg	480
tacgttcaag cagetaatct tcacctcagc gtgcttcgag acgttagcgt gtttgggcaa	540
aggtggggat tcgatgctgc aaccatcaat agccgttaca acgaccttac taggctgatt	600
ggaaactaca ccgaccacgc tgttcgttgg tacaacactg gcttggagcg tgtctgggggt	660
cctgattcta gagattggat tagatacaac cagttcagga gagaattgac cctcacagtt	720
ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagtg	780
tcccaactta ccagagaaat ctataactaac ccagttcttg agaacttcga cggtagcttc	840
cgtggttctg cccaaggat cgaaggctcc atcaggagcc cacacttgat ggacatcttg	900
aacagcataa ctatctacac cgatgctcac agaggagagt attactggtc tggacaccag	960
atcatggcct ctccagttgg attcagcggg cccgagttta cctttcctct ctatggaact	1020
atgggaaacg ccgctccaca acaacgtatc gttgctcaac taggtcaggg tgtctacaga	1080
accttgtctt ccaccttgta cagaagaccc ttcaatatcg gtatcaacaa ccagcaactt	1140
tccgttcttg acggaacaga gttcgcttat ggaacctctt ctaacttgcc atccgctgtt	1200
tacagaaaga gcggaaccgt tgattccttg gacgaaatcc caccacagaa caacaatgtg	1260
ccaccaggc aaggattctc ccacaggttg agccacgtgt ccatgttcgg ttccggattc	1320
agcaacagtt ccgtgagcat catcagagct cctatgttct cttggatata ccgtagtgt	1380
gagttcaaca acatcatcgc atccgatagt attactcaaa tccctgcagt gaagggaaac	1440
tttctcttca acggttctgt catttcagga ccaggattca ctggtggaga cctcgttaga	1500
ctcaacagca gtggaaataa cattcagaat agagggtata ttgaagttcc aattcacttc	1560
ccatccacat ctaccagata tagagtctgt gtgaggtatg cttctgtgac ccctattcac	1620
ctcaacgtta attggggtaa ttcatccatc ttctccaata cagttccagc tacagctacc	1680
tccttgata atctccaatc cagcgatttc gggtactttg aaagtgccaa tgcttttaca	1740
tcttcaactc gtaacatcgt ggggtgtaga aacttttagtg ggactgcagg agtgattatc	1800
gacagattcg agttcattcc agttactgca aactcagagg ctgaatataa tctggaaaga	1860
gcgcagaagg cggatgaatgc gctgtttacg tctacaaacc aactagggct aaaaacaaat	1920
gtaacggatt atcatattga tcaagtgtcc aatttagtta cgtatttatc ggatgaattt	1980

tgtctggatg aaaagcgaga attgtccgag aaagtcaaac atgcgaagcg actcagtgat	2040
gaacgcaatt tactccaaga ttcaaatttc aaagacatta ataggcaacc agaacgtggg	2100
tggggcgga gtacagggat taccatccaa ggaggggatg acgtatttaa agaaaattac	2160
gtcacactat caggtaacct tgatgagtg tatccaacat atttgtatca aaaaatcgat	2220
gaatcaaaat taaaagcctt taccggttat caattaagag ggtatatcga agatagtcaa	2280
gacttagaaa tctatttaat tcgctacaat gcaaaacatg aaacagttaa tgtgccaggt	2340
acgggttcct tatggccgct ttcagcccaa agtccaatcg gaaagtgtgg agagccgaat	2400
cgatgcgcgc cacaccttga atggaatcct gacttagatt gttcgtgtag ggatggagaa	2460
aagtgtgccc atcattcgca tcatttctcc ttagacattg atgtaggatg tacagactta	2520
aatgaggacc taggtgtatg ggtgatcttt aagattaaga cgcaagatgg gcacgcaaga	2580
ctagggaaatc tagagtttct cgaagagaaa ccattagtag gagaagcgct agctcgtgtg	2640
aaaagagcgg agaaaaaatg gagagacaaa cgtgaaaaat tggaatggga aacaaatattc	2700
gtttataaag aggcaaaaga atctgtagat gctttatttg taaactctca atatgatcaa	2760
ttacaagcgg atacgaatat tgccatgatt catgcggcag ataaacgtgt tcatagcatt	2820
cgagaagctt atctgcctga gctgtctgtg attccgggtg tcaatgcggc tatttttgaa	2880
gaattagaag ggcgtatttt cactgcattc tccctatatg atgcgagaaa tgtcattaaa	2940
aatggtgatt ttaataatgg cttatcctgc tggaacgtga aagggcattg agatgtagaa	3000
gaacaaaaca accaacgttc ggtccttggt gttccggaat ggaagcaga agtgtcacia	3060
gaagtccgtg tctgtccggg tcgtggctat atccttcgtg tcacagcgta caaggagga	3120
tatggagaag gttgcgtaac cattcatgag atcgagaaca atacagacga actgaagttt	3180
agcaactgcg tagaagagga aatctatcca aataacacgg taacgtgtaa tgattatact	3240
gtaaatacaag aagaatacgg aggtgcgtac acttctcgta atcgaggata taacgaagct	3300
ccttccgtac cagctgatta tgcgtcagtc tatgaagaaa aatcgataac agatggacga	3360
agagagaatc cttgtgaatt taacagaggg tatagggatt acacgccact accagttggt	3420
tatgtgacaa aagaattaga atacttccca gaaaccgata aggtatggat tgagattgga	3480
gaaacggaag gaacatttat cgtggacagc gtggaattac tccttatgga ggaa	3534

<210> 10

<211> 3534

<212> DNA

<213> *Bacillus thuringiensis*

<220>

<223> wild type full length HD73 (Cry1Ac) gene, described in Example 3  
and set forth in upper line of Figures 9-11

<400> 10

atggataaca atccgaacat caatgaatgc attccttata attgtttaag taaccctgaa	60
gtagaagtat taggtggaga aagaatagaa actggttaca cccaatcga tatttccttg	120
tgcctaacgc aatttccttt gagtgaattt gttcccgggtg ctggatttgt gttaggacta	180
gttgatataa tatggggaat ttttgggtccc tctcaatggg acgcatttct tgtacaaatt	240
gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta	300
gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat	360
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc	420
cttacaaccg ctattcctct ttttgcagtt caaaattatc aagttcctct tttatcagta	480
tatgttcaag ctgcaaattt acatttatca gttttgagag atgtttcagt gtttggacaa	540
aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt	600
ggcaactata cagatcatgc tgtacgctgg tacaatacgg gattagagcg tgtatgggga	660
ccggattcta gagattggat aagatataat caatttagaa gagaattaac actaactgta	720
ttagatatcg tttctctatt tccgaactat gatagtagaa cgtatccaat tcgaacagtt	780
tcccaattaa caagagaaat ttatacaaac ccagtattag aaaattttga tggtagtttt	840
cgaggctcgg ctcagggcat agaaggaagt attaggagtc cacatttgat ggatatactt	900
aatagtataa ccatctatac ggatgctcat agaggagaat attattggtc agggcatcaa	960
ataatggctt ctctgtagg gttttcgggg ccagaattca cttttccgct atatggaact	1020
atgggaaatg cagctccaca acaacgtatt gttgctcaac taggtcaggg cgtgtataga	1080
acattatcgt ccaccttata tagaagacct tttaatatag ggataaataa tcaacaacta	1140
tctgttcttg acgggacaga atttgcttat ggaacctcct caaatttgcc atccgctgta	1200
tacagaaaaa gcggaacggt agattcgctg gatgaaatac cgccacagaa taacaacgtg	1260

ccacctagggc aaggatttag tcatcgatta agccatgttt caatgtttcg ttcaggcttt	1320
agtaatagta gtgtaagtat aataagagct cctatgttct cttggataca tcgtagtgct	1380
gaatttaata atataattgc atcggatagt attactcaaa tccctgcagt gaagggaaac	1440
tttcttttta atgggttctgt aatttcagga ccaggattta ctggtgggga cttagttaga	1500
ttaaatagta gtggaaataa cattcagaat agagggata ttgaagtcc aattcacttc	1560
ccatcgacat ctaccagata tcgagttcgt gtacggtatg cttctgtaac cccgattcac	1620
ctcaacgtta attggggtaa ttcattccatt tttccaata cagtaccagc tacagctacg	1680
tcattagata atctacaatc aagtgatttt gggtattttg aaagtgccaa tgcttttaca	1740
tcttcattag gtaatatagt aggtgttaga aatttttagtg ggactgcagg agtgataata	1800
gacagatttg aatttattcc agttactgca acactcgagg ctgaatataa tctggaaaga	1860
gcgcagaagg cggatgaatgc gctgtttacg tctacaaacc aactagggct aaaaacaaat	1920
gtaacggatt atcatattga tcaagtgtcc aatttagtta cgtatttatc ggatgaattt	1980
tgtctggatg aaaagcgaga attgtccgag aaagtcaaac atgcgaagcg actcagtgat	2040
gaacgcaatt tactccaaga ttcaaatttc aaagacatta ataggcaacc agaacgtggg	2100
tggggcgga gtacagggat taccatcaa ggaggggatg acgtatttaa agaaaattac	2160
gtcacactat caggtacctt tgatgagtgc tatccaacat atttgatca aaaaatcgat	2220
gaatcaaaat taaaagcctt taccggttat caattaagag ggtatatcga agatagtcaa	2280
gacttagaaa tctatttaat tcgtacaat gcaaacatg aaacagtaaa tgtgccaggt	2340
acgggttcct tatggccgct ttcagcccaa agtccaatcg gaaagtgtgg agagccgaat	2400
cgatgcgcgc cacaccttga atggaatcct gacttagatt gtctgtgtag ggatggagaa	2460
aagtgtgccc atcattecgca tcatttctcc ttagacattg atgtaggatg tacagactta	2520
aatgaggacc taggtgtatg ggtgatcttt aagattaaga cgcaagatgg gcacgcaaga	2580

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ctaggggaatc tagagtttct cgaagagaaa ccattagtag gagaagcgct agctcgtgtg      2640
aaaagagcgg agaaaaaatg gagagacaaa cgtgaaaaat tggaatggga aacaaatatac      2700
gtttataaaag aggcaaaaga atctgtagat gctttatttg taaactctca atatgatcaa      2760
ttacaagcgg atacgaatat tgccatgatt catgcggcag ataaacgtgt tcatagcatt      2820
cgagaagctt atctgcctga gctgtctgtg attccgggtg tcaatgcggc tatttttgaa      2880
gaattagaag ggcgtatfff cactgcattc tccctatatg atgcgagaaa tgtcattaaa      2940
aatggtgatt ttaataatgg cttatcctgc tggaacgtga aagggcatgt agatgtagaa      3000
gaacaaaaca accaacgttc ggtccttggt gttccggaat ggaagcaga agtgtcacao      3060
gaagttcgtg tctgtccggg tcgtggctat atccttcgtg tcacagcgta caaggaggga      3120
tatggagaag gttgcgtaac cattcatgag atcgagaaca atacagacga actgaagttt      3180
agcaactgcg tagaagagga aatctatcca aataacacgg taacgtgtaa tgattatact      3240
gtaaatcaag aagaatacgg aggtgcgtac acttctcgta atcgaggata taacgaagct      3300
ccttccgtac cagctgatta tgcgtcagtc tatgaagaaa aatcgtatac agatggacga      3360
agagagaatc cttgtgaatt taacagaggg tatagggatt acacgccact accagttggg      3420
tatgtgacaa aagaattaga atacttcca gaaaccgata aggtatggat tgagattgga      3480
gaaacggaag gaacatttat cgtggacagc gtggaattac tccttatgga ggaa          3534

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<210> 11

<211> 3534

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic/modified sequence encoding HD73 (CryAc)described in  
Example 3 and set forth as lower line in Figure 10

<400> 11

atggacaaca acccaaacat caacgaatgc attccatata actgcttgag taaccagaa	60
gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatcga catctccttg	120
tccttgacac agtttctgct cagcgagttc gtgccaggtg ctgggttcgt tctcggacta	180
gttgacatca tctggggtat ctttggtcca tctcaatggg atgcattcct ggtgcaaatt	240
gagcagttga tcaaccagag gatcgaagag ttcgccagga accaggccat ctctaggttg	300
gaaggattga gcaatctcta ccaaattctat gcagagagct tcagagagtg ggaagccgat	360
cctactaacc cagctctccg cgaggaaatg cgtattcaat tcaacgacat gaacagcgcc	420
ttgaccacag ctatcccatg gttcgcagtc cagaactacc aagttcctct cttgtccgtg	480
tacgttcaag cagctaattc tcacctcagc gtgcttcgag acgttagcgt gtttgggcaa	540
aggtggggat tcgatgctgc aaccatcaat agccgttaca acgaccttac taggctgatt	600
ggaaactaca ccgaccacgc tgttcgttg tacaacactg gcttgagcgc tgtctggggt	660
cctgattcta gagattggat tagataaac cagttcagga gagaattgac cctcacagtt	720
ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagt	780
tcccaactta ccagagaaat ctatactaac ccagttcttg agaacttcga cggtagcttc	840
cgtggttctg cccaaggat cgaaggctcc atcaggagcc cacacttgat ggacatcttg	900
aacagcataa ctatctacac cgatgctcac agaggagagt attactgggc tggacaccag	960
atcatggcct ctccagttgg attcagcggg cccgagttta cctttcctct ctatggaact	1020
atgggaaacg ccgctccaca acaacgtatc gttgctcaac taggtcaggg tgtctacaga	1080
accttgtctt ccaccttgta cagaagaccc ttcaatatcg gtatcaacaa ccagcaactt	1140
tcggttcttg acggaacaga gttcgcttat ggaacctctt ctaacttgcc atccgctggt	1200
tacagaaaga gcggaaccgt tgattccttg gacgaaatcc caccacagaa caacaatgtg	1260
ccaccagggc aaggattctc ccacaggttg agccacgtgt ccatgttccg ttccggatcc	1320



agcaacagtt ccgtagcat catcagagct cctatgttct cttggatata ccgtagtgct	1380
gagttcaaca acatcatcgc atccgatagt attactcaaa tccctgcagt gaagggaac	1440
ttctctttca acggttctgt catttcagga ccaggattca ctggtggaga cctcgttaga	1500
ctcaacagca gtggaaataa cattcagaat agaggggtata ttgaagttcc aattcacttc	1560
ccatccacat ctaccagata tagagtctgt gtgaggtatg cttctgtgac ccctattcac	1620
ctcaacgtta attggggtaa ttcattccatc ttctccaata cagttccagc tacagctacc	1680
tccttggata atctccaatc cagcgatttc gggtactttg aaagtgccaa tgcttttaca	1740
tcttcactcg gtaacatcgt ggggtgtaga aacttttagtg ggactgcagg agtgattatc	1800
gacagattcg agttcattcc agttactgca aactcagagg ctgaatataa tctggaaaga	1860
gcgcagaagg cggatgaatgc gctgtttacg tctacaaacc agctcggcct caagaccaat	1920
gtgacggatt atcatattga tcaagtgtcc aacttgggtga cctacctcag cgatgagttc	1980
tgtctggatg aaaagcgaga attgtccgag aaagtcaaac atgcgaagcg actcagtgat	2040
gaacgcaatt tactccaaga ttcaaatttc aaagacatta ataggcaacc agaacgtggg	2100
tggggcgga gtacagggat taccatccag ggaggtgacg acgtgttcaa ggagaactac	2160
gtcacactat caggtacctt tgatgagtgc tatccaacat acctctacca gaagatcgac	2220
gagtcgaagt tgaaagcctt taccogttat caattaagag ggtatatcga agatagtcaa	2280
gacctcgaga tctacctcat ccgctacaat gcaaaacatg aaacagtaaa tgtgccaggt	2340
acgggttcct tatggccgct ttcagcccaa agtccaatcg gaaagtgtgg agagccgaat	2400
cgatgcgcgc cacaccttga atggaatcct gacttagatt gttcgtgtag ggatggagaa	2460
aagtgtgccc atcattcgca tcattttctcc ttagacattg atgtaggatg tacagactta	2520
aatgaggacc taggtgtatg ggtgatcttt aagattaaga cgcaagatgg gcacgcaaga	2580
ctaggggaatc tagagtttct cgaagagaaa ccattagtag gagaagcgct agctcgtgtg	2640

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aaaagagcgg agaaaaaatg gagagacaaa cgtgagaagt tggaatggga gaccaacatc 2700
gtctacaaag aggcaaaaga atctgtagat gctttatttg taaactctca atatgatcaa 2760
ttacaagcgg atacgaatat tgccatgatt catgcggcag ataaacgtgt tcatagcatt 2820
cgagaagctt atctgcctga gctgtctgtg attccgggtg tcaatgcggc tattttttgaa 2880
gaattagaag ggcgtatddd cactgcattc tccctctacg atgccagaaa cgatcatcaag 2940
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gaacaaaaca accaacgttc ggtccttggt gttccggaat gggaagcaga agtgtcacia 3060
gaagttcgtg tctgtccggg tcgtggctat atccttcgtg tcacagcgta caaggaggga 3120
tatggagaag gttgcgtaac cattcatgag atcgagaaca atacagacga actgaagttt 3180
agcaactgcg tagaagagga aatctatcca aataacacgg taacgtgtaa tgattatact 3240
gtaaatcaag aagaatacgg aggtgcgtac acttctcgta atcgaggata taacgaagct 3300
ccttccgtac cagctgatta tgcgtcagtc tatgaagaaa aatcgtatac agatggacga 3360
agagagaatc cttgtgaatt taacagaggg tatagggatt acacgccact accagttggt 3420
tatgtgacia aagaattaga atacttcca gaaaccgata aggtatggat tgagattgga 3480
gaaacggaag gaacatddd cgtggacagc gtggaattac tccttatgga ggaa 3534

```

<210> 12

<211> 3534

<212> DNA

<213> Artificial sequence

<220>

<223> Fully synthetic sequence encoding insecticidal toxin encoding HD-73 (Cry1Ac) described in Example 3 and set forth in the lower line of Figure 11

<400> 12

```

atggacaaca acccaaakat caacgaatgc attccatata actgcttgag taaccacaaa 60

```

gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatoga catctccttg	120
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ggaaactaca ccgaccacgc tgttcgttgg tacaacactg gcttggagcg tgtctgggg	660
cctgattcta gagattggat tagatacaac cagttcagga gagaattgac cctcacagtt	720
ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagtg	780
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tccaactgcg tcgaggaaga aatctatccc aacaacaccg ttacttgcaa cgactacact	3240
gtgaatcagg aagagtacgg aggtgcctac actagccgta acagagggtta caacgaagct	3300
ccttcctgtc ctgctgacta tgcctccgtg tacgaggaga aatcctacac agatggcaga	3360
cgtgagaacc cttgcgagtt caacagaggt tacagggact acacaccact tccagttggc	3420
tatgttacca aggagcttga gtactttcct gagaccgaca aagtgtggat cgagatcgg	3480
gaaaccgagg gaaccttcat cgtggacagc gtggagcttc tcttgatgga ggaa	3534

<210> 13

<211> 3531

<212> DNA

<213> Artificial sequence

<220>

<223> Nucleotide sequence described as HD-73 (Cry1Ac) in Example 3  
(page 59, lines 13-16), nucleotide 1-1830 as set forth in lower line  
of Figure 11

<400> 13

atggacaaca acccaaacat caacgaatgc attccatata actgcttgag taaccagaa	60
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gttgaagtac ttggtggaga acgcattgaa accggttaca ctcccatcga catctccttg	120
tccttgacac agtttctgct cagcgagttc gtgccaggtg ctgggttcgt tctcggacta	180
gttgacatca tctgggggtat ctttgggtcca tctcaatggg atgcattcct ggtgcaaatt	240
gagcagttga tcaaccagag gatcgaagag ttcgccagga accaggccat ctctaggttg	300
gaaggattga gcaatctcta ccaaattctat gcagagagct tcagagagtg ggaagccgat	360
cctactaacc cagctctccg cgaggaaatg cgtattcaat tcaacgacat gaacagcgcc	420
ttgaccacag ctatcccatt gttcgcagtc cagaactacc aagttcctct cttgtccgtg	480
tacgttcaag cagctaattc tcacctcagc gtgcttcgag acgttagcgt gtttgggcaa	540
aggtgggggat tcgatgctgc aaccatcaat agccgttaca acgaccttac taggctgatt	600
ggaaactaca ccgaccacgc tgttcggttg tacaacactg gcttggagcg tgtctgggg	660
cctgattcta gagattggat tagatacaac cagttcagga gagaattgac cctcacagtt	720
ttggacattg tgtctctctt cccgaactat gactccagaa cctaccctat ccgtacagtg	780
tcccaactta ccagagaaat ctatactaac ccagttcttg agaacttcga cggtagcttc	840
cgtggttctg cccaaggtat cgaaggctcc atcaggagcc cacacttgat ggacatcttg	900
aacagcataa ctatctacac cgatgctcac agaggagagt attactggtc tggacaccag	960
atcatggcct ctccagttgg attcagcggg cccgagttta cctttcctct ctatggaact	1020
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gagttcaaca atatcattcc ttccctctcaa atcacccaaa tcccattgac caagtctact	1440
aaccttggat ctggaacttc tgtcgtgaaa ggaccagggt tcacaggagg tgatattctt	1500
agaagaactt ctccctggcca gattagcacc ctgagagtta acatcactgc accactttct	1560
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accctctccg gaactttcga cgagtgtac cctacctact tgtaccagaa gatcgatgag	2220
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cttgaaatct actcgatcag gtacaatgcc aagcacgaga ccgtgaatgt cccaggtact	2340
ggttccctct ggccactttc tgcccaatct cccattggga agtgtggaga gcctaacaga	2400
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tgtgccacc attctcatca cttctccttg gacatcgatg tgggatgtac tgacctgaat	2520
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ggcaaccttg agtttctcga agagaaacca ttggtcgggtg aagctctcgc tcgtgtgaag	2640
agagcagaga agaagtggag ggacaaacgt gagaaactcg aatgggaaac taacatcggt	2700

tacaaggagg ccaaagagtc cgtggatgct ttgttcgtga actcccaata tgatcagttg	2760
caagccgaca ccaacatcgc catgatccac gccgcagaca aacgtgtgca cagcattcgt	2820
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cttgagggac gtatctttac cgcattctcc ttgtacgatg ccagaaacgt catcaagaac	2940
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ggtgaggggt gcgtgaccat ccacgagatc gagaacaaca ccgacgagct taagttctcc	3180
aactgcgtcg aggaagaaat ctatcccaac aacaccgtta cttgcaacga ctacactgtg	3240
aatcaggaag agtacggagg tgcctacact agccgtaaca gaggttaca cgaagctcct	3300
tccgttcctg ctgactatgc ctccgtgtac gaggagaaat cctacacaga tggcagacgt	3360
gagaaccctt gcgagttcaa cagaggttac agggactaca caccacttcc agttggctat	3420
gttaccaagg agcttgagta ctttcctgag accgacaaag tgtggatcga gatcggtgaa	3480
accgagggaa ccttcacgtg ggacagcgtg gagcttctct tgatggagga a	3531

<210> 14

<211> 1791

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic nucleotide sequence encoding a Btt toxin (Cry3Aa),  
described in Example 5 and set forth in the lower line in Figure  
12

<400> 14

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aagggatatc ccgttggtgg agacctcttg ggcgtgggtg gatttcctt cggtggagcc	120



ctcgtgagct tctatacaaa ctttctcaac accatttggc caagcgagga cccttggaaa	180
gcattcatgg agcaagttga agctcttatg gatcagaaga ttgcagatta tgccaagaac	240
aaggctttgg cagaactcca gggccttcag aacaatgtgg aggactacgt gagtgcattg	300
tccagctggc agaagaacct tgtagctcc agaaatcctc acagccaagg taggatcaga	360
gagttgttct ctcaagccga atcccacttc agaaattcca tgcttagctt tgctatctcc	420
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ccaggatact atggtaacga ctccttcaac tattgggtccg gtaactatgt ttccaccaga	960
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cctgtgcaga accttgagtt caacggcgag aaagtctata gagccgtcgc aaacaccaat	1080
ctcgtgtgtt ggccatccgc agtttactca ggcgtcacia aggtggagtt tagtcagtat	1140
aacgatcaga ccgatgaggc cagcaccag acttacgact ccaaacgtaa cgttggcgca	1200
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attccagtgt tgacctggac acacaagtcc gtggacttct tcaacatgat cgatagcaag	1380
aagatcactc aacttccctt ggtgaaagcc tacaagctgc aatctggtgc ttccgttgct	1440

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gcaggtccca gattcactgg aggtgacatc atccagtgca cagagaacgg cagcgcagct 1500
actatctacg tgacacctga tgtgtcttac tctcagaagt acagggcacg tattcattac 1560
gcatctacca gccagatcac cttcacactc agcttggatg gagcaccctt caaccagtat 1620
tactttgaca agaccatcaa caaagggtgac actctcacat acaatagctt caacttggca 1680
agtttcagca caccatttga actctcaggc aacaatcttc agatcggcgt caccggtctc 1740
agcgccggag acaaagtcta catcgacaag attgagttca tcccagtga c 1791

```

<210> 15

<211> 1791

<212> DNA

<213> Artificial sequence

<220>

<223> Btt toxin (Cry3Aa), Example 5 and upper line in Figure 12

<400> 15

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gcttttatgg aacaagtaga agcattgatg gatcagaaaa tagctgatta tgcaaaaaat 240
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agttcatggc aaaaaaatcc tgtgagttca cgaaatccac atagccaggg gcggataaga 360
gagctgtttt ctcaagcaga aagtcatttt cgtaattcaa tgccttcggt tgcaatttct 420
ggatacgagg ttctatttct aacaacatat gcacaagctg ccaacacaca tttattttta 480
ctaaaagacg ctcaaattta tggagaagaa tggggatacg aaaaagaaga tattgctgaa 540
ttttataaaa gacaactaaa acttacgcaa gaatatactg accatttgtgt caaatgggtat 600
aatgttggat tagataaatt aagagggttca tcttatgaat cttgggtaaa ctttaaccgt 660

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tatcgcagag agatgacatt aacagtatta gatttaattg cactatttcc attgtatgat	720
gttcggctat acccaaaaga agttaaaacc gaattaacaa gagacgtttt aacagatcca	780
attgtcggag tcaacaacct taggggctat ggaacaacct tctctaatat agaaaattat	840
attcgaaaac cacatctatt tgactatctg catagaattc aatttcacac gcggttccaa	900
ccaggatatt atggaaatga ctctttcaat tattgggtccg gtaattatgt ttcaactaga	960
ccaagcatag gatcaaatga tataatcaca tctccattct atggaaataa atccagtga	1020
cctgtacaaa atttagaatt taatggagaa aaagtctata gagccgtagc aaatacaaat	1080
cttgcggtct ggccgtccgc tgtatattca ggtgttacia aagtgggaatt tagccaatat	1140
aatgatcaaa cagatgaagc aagtacacia acgtacgact caaaaagaaa tggtggcgcg	1200
gtcagctggg attctatcga tcaattgcct ccagaaacia cagatgaacc tctagaaaag	1260
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atcccagtgt taacttggac acataaaaagt gtagactttt ttaacatgat tgattcgaaa	1380
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gcttctacat ctacagataac atttacactc agtttagacg gggcaccatt taatcaatac	1620
tatttcgata aaacgataaa taaaggagac acattaacgt ataattcatt taatttagca	1680
agtttcagca caccattcga attatcaggg aataacttac aaataggcgt cacaggatta	1740
agtgctggag ataaagttta tatagacaaa attgaattta ttccagtga t	1791

<210> 16

<211> 1902

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic nucleotide sequence encoding *Bacillus thuringiensis* kurstaki HD-1 insecticidal toxin P2 (Cry2Aa) described in Example 6 and set forth in the lower line in Figure 13

<400> 16

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gaatggaaac gtactgacca ctctctctac gtcgcacctg tggttggaac agtgtccagc      180
ttcctttctca agaaggtcgg ctctctcatc ggaaaacgta tcttgtccga actctggggg      240
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aatcctgtgc ctctttccat cacttcttcc gtgaacacta tgcagcaact cttcctcaac      480
agattgcctc agtttcagat tcaaggctac cagttgctcc ttcttccact ctttgctcag      540
gctgccaaaca tgcacttgtc cttcatacgt gacgtgatcc tcaacgctga cgaatgggga      600
atctctgcag ccactcttag gacatacaga gactacttga ggaactacac tcgtgattac      660
tccaactatt gcatcaacac ttatcagact gcctttcgtg gactcaatac taggcttcac      720
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gtgaactaca gtggaggtgt cagctctgga ttgattgggtg caactaactt gaaccacaac     1080
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 gactacttca ttaggaacat ctctggtggt cctctcgtca tcaggaatga agacctcacc 1320  
 cgtccacttc attacaacca gattaggaac atcgagtctc catccggtac tccaggaggt 1380  
 gcaagagctt acctcgtgtc tgtccataac aggaagaaca acatctacgc tgccaacgag 1440  
 aatggcacca tgattcacct tgcaccagaa gattacactg gattcaccat ctctccaatc 1500  
 catgctaccc aagtgaacaa tcagacacgc accttcatct ccgaaaagtt cggaaatcaa 1560  
 ggtgactcct tgaggttcga gcaatccaac actaccgcta ggtacacttt gagaggcaat 1620  
 ggaaacagct acaaccttta cttgagaggt agtccattg gtaactccac catccgtggt 1680  
 accatcaacg gacgtgttta cacagtctct aatgtgaaca ctacaacgaa caatgatggc 1740  
 gttaacgaca acggagccag attcagcgac atcaacattg gcaacatcgt ggctctgac 1800  
 aacactaacg ttactttgga catcaatgtg acctcaatt ctggaactcc atttgatctc 1860  
 atgaacatca tgtttgtgcc aactaacctc cctccattgt ac 1902

<210> 17

<211> 1899

<212> DNA

<213> Artificial sequence

<220>

<223> P2 (Cry2Aa), Example 6 and set forth in upper line in Figure 13

<400> 17

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 tggaaaagaa cagatcatag tttatatgta gtcctgtag tcggaactgt gtctagtttt 180  
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atatttccta gtggtagtagt aaatctaata caagatatatt taagggagag agaacaattc	300
ctaaatcaaa gacttaatac agataccctt gctcgtgtaa atgcagaatt gatagggctc	360
caagcgaata taagggaggt taatcaacaa gtagataatt ttttaaacc tactcaaaac	420
cctgttcctt tatcaataac ttcttcgggt aatacaatgc agcaattatt tctaaataga	480
ttaccccagt tccagatata aggataccag ttgttattat tacctttatt tgcacaggca	540
gccaatatgc atctttcttt tattagagat gttattctta atgcagatga atgggggtatt	600
tcagcagcaa cattacgtac gtatcgagat tacctgagaa attatacaag agattattct	660
aattattgta taaatacgta tcaaactgcg tttagagggt taaacacccg tttacacgat	720
atgttagaat ttagaacata tatgttttta aatgtatttg aatatgtatc catttggtca	780
ttgtttaaat atcagagtct tatgggtatct tctggcgcta atttatatgc tagcggtagt	840
ggaccacagc agacacaatc atttacagca caaaactggc catttttata ttctcttttc	900
caagttaatt cgaattatat attatctggg attagtggta ctaggctttc tattaccttc	960
cctaattattg gtgggtttacc gggtagtact acaactcatt cattgaatag tgccagggtt	1020
aattatagcg gaggagtttc atctgggtctc ataggggcga ctaatctcaa tcacaacttt	1080
aattgcagca cggtcctccc tcctttatca acaccatttg ttagaagttg gctggattca	1140
ggtacagatc gagagggcgt tgctacctct acgaattggc agacagaatc ctttcaaaca	1200
actttaagtt taaggtgtgg tgctttttca gcccggtgaa attcaaacta tttccagat	1260
tattttatcc gtaatatctc tgggggttcct ttagttatta gaaacgaaga tctaacaaga	1320
ccgttacact ataaccaaata aagaaatata gaaagtcctt cgggaacacc tgggtggagca	1380
cgggcctatt tgggtatctgt gcataacaga aaaaataata tctatgcgcg taatgaaaat	1440
ggtactatga tccatttggc gccagaagat tatacaggat ttactatata gccaatatcat	1500
gccactcaag tgaataatca aactcgaaca tttatttctg aaaaatttgg aatcaaggt	1560

gattccttaa gatttgaaca aagcaacacg acagctcggt atacgcttag agggaatgga 1620  
aatagttaca atctttatct aagagtatct tcaataggaa attcaactat togagttact 1680  
ataaacggta gagtttatac tgtttcaa at gtttaatacca ctacaaataa cgatggagtt 1740  
aatgataatg gagctcggtt ttcagatatt aatatcggt ataatagtagc aagtgataat 1800  
actaatgtaa cgctagatat aaatgtgaca ttaaactccg gtactccatt tgatctcatg 1860  
aatattatgt ttgtgccaac taatcttcca ccactttat 1899

<210> 18  
<211> 3567  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Synthetic nucleotide sequence encoding Bt entomocidus  
insecticidal protein (Cry1Ca), described in Example 7 and set  
forth in the lower line of Figure 14

<400> 18  
atggaggaga acaacccaaa ccaatgcatt ccatacaact gcttgagtaa cccagaagag 60  
gtattgcttg atggagaacg catttcaacc ggtaactctt ccacgacat ctccttgctc 120  
ttggtccagt ttctggtcag caacttcgtg ccagggtggtg gggttccttgt cggactaatt 180  
gacttcgtct ggggtatcgt tgggtccatct caatgggatg cattcctggt gcaaattgag 240  
cagttgatca acgagaggat cgctgagttc gccaggaacg ctgccatcgc taacttggaa 300  
ggattgggca ataacttcaa catctatgtg gaggccttca aagagtggga agaggaccct 360  
aacaaccag agaccgcac tagggatgatc gacagattca gaatcttgga cggcctcttg 420  
gagagagata tcccatcctt cagaatctct ggcttcgaag ttctctctct gtccgtgtac 480  
gctcaagcag ctaatcttca cctcgtatc cttcgagaca gtgtcatctt tggggaaagg 540  
tggggattga ccactatcaa cgtcaatgag aattacaaca gacttatcag gcacattgac 600

gagtagcgccg accactgtgc taacacctac aaccgtggct tgaacaatct ccctaagtct	660
acttatcaag attggattac ctacaacagg ttgaggagag acttgaccct cacagttttg	720
gacattgcag ctttcttccc gaactatgac aacaggagat accctatcca accagtgggt	780
caacttacca gagaagtcta tactgacca cttatcaact tcaacctca gttgcaaagt	840
gtcgcccaac ttcccacatt caacgtcatg gagtccagcc gtatcaggaa cccacacttg	900
tttgacatct tgaacaacct tactatcttc accgattggg tcagcgttgg gcgtaacttc	960
tattgggggtg gacacagggg catctcctct cttattggag gtgggaacat tacctctcct	1020
atctatggac gtgaggcaaa ccaggagcca ccacgtagtt tcacctcaa cgggccagtc	1080
ttcagaacct tgtctaacc taccttgaga ttgctccagc aaccttggcc agctccacct	1140
ttcaacctta gaggtgttga gggcgttgag ttctctactc ctaccaactc cttcacttac	1200
agaggtagag gaaccgttga ttcttgacc gaactccac cagaggacaa tagcgtgcca	1260
cccaggggaag gctactcca caggttgtgc caccgaacct tcgtgcagcg ttccggaact	1320
ccattcctca ctacaggagt tgtgttctca tggactgac gtagtgtac tctcactaat	1380
accattgac ccgagaggat caatcaaacc ccatttgtca agggtttccg tgtgtgggga	1440
ggaacttctg tcatcacagg accaggcttc acaggaggtg atattcttag aagaaacact	1500
tttggcgact ttgtgagcct ccaagttaac atcaactctc caattactca aagatatcgt	1560
ctcaggtttc gttacgcac ttcccgtagc gctagagtca tcgtgctcac cggagcagct	1620
tctaccggtg tcggtggaca agtctccgtg aacatgccac tccagaagac tatggagatc	1680
ggcgagaact tgacatccag gaccttcaga tacaccgact tctctaacc tttcagtttc	1740
cgtgcccaacc ctgacatcat tggcattagc gaacaacctc tctttggagc tggtagcatc	1800
tcatctggcg aattgtacat tgacaagatt gagatcattc ttgccgacgc taccttcgag	1860
gctgagtcctg accttgagag agcccagaag gctgtgaacg cctcttttac ctctctaat	1920



cagattggct tgaaaactga cgttactgac tatcacattg accaagtgtc caacttggtc	1980
gactgcctta gcgatgagtt ctgcctcgac gagaagcgtg aactctccga gaaagttaaa	2040
cacgccaaagc gtctcagcga cgagaggaat ctcttgcaag accccaactt cagaggcatc	2100
aacaggcagc cagaccgtgg ttggagagga agcaccgaca tcaccatcca aggaggcgac	2160
gatgtgttca aggagaacta cgtcaccctc ccaggaactg tggacgagtg ctaccctacc	2220
tacttgtacc agaagatcga tgagtccaaa ctcaaagcct acaccaggta tgaacttaga	2280
ggctacatcg aagacagcca agaccttgaa atctacctca tcaggtaaa tgccaagcac	2340
gagatcgtga atgtcccagg tactggttcc ctctggccac tttctgcca aatgcccatt	2400
gggaagtgtg gagagcctaa cagatgcgct ccacaccttg agtggaatcc tgacttggac	2460
tgctcctgca gggatggcga gaagtgtgcc caccattctc atcacttcac cttggacatc	2520
gatgtgggat gtactgacct gaatgaggac ctcgaggtct gggtcacctt caagatcaag	2580
acccaagacg gacacgcaag acttggcaac cttgagtttc tcgaagagaa accattgctc	2640
ggtgaagctc tcgctcgtgt gaagagagca gagaagaagt ggagggacaa acgtgagaaa	2700
ctccaactcg agactaacat cgtttacaag gaggccaaag agtccgtgga tgctttgttc	2760
gtgaactccc aatatgatag gttgcaagtg gacaccaaca tcgccatgat ccacgctgca	2820
gacaaacgtg tgcacaggat tcgtgaggct tacttgcttg agttgtccgt gatccctggg	2880
gtgaacgctg ccatcttcga ggaacttgag ggacgtatct ttaccgcata ctcttgtac	2940
gatgccagaa acgtcatcaa gaacggtgac ttcaacaatg gcctcttggt ctggaatgtg	3000
aaagggtcatg tggacgtgga ggaacagaac aatcacctgt ccgtcctggg tatccctgag	3060
tgggaagctg aagtgtccca agagggttaga gtctgtccag gtagaggcta cattctccgt	3120
gtgaccgctt acaaggaggg atacggtgag ggttgctgga ccatccacga gatcgaggac	3180
aacaccgacg agcttaagtt ctccaactgc gtcgaggaag aagtctatcc caacaacacc	3240

gttacttgca acaactacac tgggacccag gaagagtacg aaggtaccta cactagccgt	3300
aaccaagggtt acgacgaagc ttacggaaac aatccttccg ttcttgctga ctatgcctcc	3360
gtgtacgagg agaaatccta cacagatggc agacgtgaga acccttgcca gtccaacaga	3420
ggttacggtg actacacacc acttccagca ggctatgtta ccaaggacct tgagtacttt	3480
cctgagaccg acaaagtgtg gatcgagatc ggtgaaaccg agggaacctt catcgtggac	3540
agcgtggagc ttctcttgat ggaggaa	3567

<210> 19

<211> 3567

<212> DNA

<213> Artificial sequence

<220>

<223> BTent (CylCa), Example 7 and set forth in upper line in Figure 14

<400> 19

atggaggaaa ataatcaaaa tcaatgcata ccttacaatt gtttaagtaa tcctgaagaa	60
gtacttttgg atggagaacg gatatacaact ggtaattcat caattgatat ttctctgtca	120
cttgttcagt ttctggatc taactttgta ccagggggag gatttttagt tggattaata	180
gattttgtat ggggaatagt tggcccttct caatgggatg catttctagt acaaattgaa	240
caattaatta atgaaagaat agctgaattt gctaggaatg ctgctattgc taatttagaa	300
ggattaggaa acaatttcaa tatatatgtg gaagcattta aagaatggga agaagatcct	360
aataatccag aaaccaggac cagagtaatt gatcgctttc gtatacttga tgggctactt	420
gaaagggaca ttcttctgtt tcgaatttct ggatttgaag taccctttt atccgtttat	480
gctcaagcgg ccaatctgca tctagctata ttaagagatt ctgtaatttt tggagaaaga	540
tggggattga caacgataaa tgtcaatgaa aactataata gactaattag gcatattgat	600
gaatatgctg atcactgtgc aaatacgtat aatcggggat taaataattt accgaaatct	660

acgtatcaag attggataac atataatcga ttacggagag acttaacatt gactgtatta	720
gatatcgccg ctttctttcc aaactatgac aataggagat atccaattca gccagttggt	780
caactaaca ggaagtta tacggacca ttaattaatt ttaatccaca gttacagtct	840
gtagtcaat tacctacttt taacgttatg gagagcagcc gaattagaaa tcctcattta	900
tttgatatat tgaataatct tacaatcttt acggattggt ttagtggttg acgcaatttt	960
tattggggag gacatcgagt aatatctagc cttataggag gtggtaacat aacatctcct	1020
atatatggaa gagaggcgaa ccaggagcct ccaagatcct ttacttttaa tggaccggta	1080
tttaggactt tatcaaatcc tactttacga ttattacagc aaccttggcc agcgccacca	1140
tttaatttac gtggtggtga aggagtagaa ttttctacac ctacaaatag ctttacgtat	1200
cgaggaagag gtacggttga ttctttaact gaattaccgc ctgaggataa tagtgtgcca	1260
cctcggaag gatatagtca tcgtttatgt catgcaactt ttgttcaaag atctggaaca	1320
ccttttttaa caactggtgt agtattttct tggaccgata gtagtgcaac tcttacaat	1380
acaattgata cagagagaat taatcaaata cctttagtga aaggatttag agtttggggg	1440
ggcacctctg tcattacagg accaggattt acaggagggg atatccttcg aagaaatacc	1500
tttggtgatt ttgtatctct acaagtcaat attaattcac caattacca aagataccgt	1560
ttaagatttc gttacgttc cagtagggat gcacgagtta tagtattaac aggagcggca	1620
tccacaggag tgggaggcca agttagtga aatatgcctc ttcagaaaac tatggaaata	1680
ggggagaact taacatctag aacatttaga tataccgatt ttagtaatcc ttttcatctt	1740
agagctaata cagatataat tgggataagt gaacaacctc tatttggtgc aggttctatt	1800
agtagcgtg aactttatat agataaaatt gaaattatc tagcagatgc aacatttgaa	1860
gcagaatctg atttagaaaag agcacaaaag gcggtgaatg ccctgtttac ttcttccaat	1920
caaatcgggt taaaaaccga tgtgacggat tatcatattg atcaagtatc caatttagtg	1980

gattgtttat cagatgaatt ttgtctggat gaaaagcgag aattgtccga gaaagtcaaa	2040
catgcgaagc gactcagtga tgagcggaat ttacttcaag atccaaactt cagagggatc	2100
aatagacaac cagaccgtgg ctggagagga agtacagata ttaccatcca aggaggagat	2160
gacgtattca aagagaatta cgtcacacta ccgggtaccg ttgatgagtg ctatccaacg	2220
tatttatatc agaaaataga tgagtcgaaa ttaaaagctt ataccggtta tgaattaaga	2280
gggtatatcg aagatagtca agacttagaa atctatttga tccgttacia tgcaaaacac	2340
gaaatagtaa atgtgccagg cacgggttcc ttatggccgc tttcagccca aatgccaatc	2400
ggaaagtgtg gagaaccgaa tcgatgcgcg ccacaccttg aatggaatcc tgatctagat	2460
tgttcttgca gagacgggga aaaatgtgca catcattccc atcatttcac cttggatatt	2520
gatgttggat gtacagactt aaatgaggac ttaggtgtat gggatgatatt caagattaag	2580
acgcaagatg gccatgcaag actagggaaat ctagagtttc tcgaagagaa accattatta	2640
ggggaagcac tagctcgtgt gaaaagagcg gagaagaagt ggagagacaa acgagagaaa	2700
ctgcagttgg aaacaaatat tgtttataaa gaggcaaaag aatctgtaga tgctttattt	2760
gtaaactctc aatatgatag attacaagtg gatacgaaca tcgccatgat tcatgcggca	2820
gataaacgcg ttcatagaat ccgggaagcg tatctgccag agttgtctgt gattccaggt	2880
gtcaatgcgg ccattttcga agaattagag ggacgtattt ttacagcgta ttccttatat	2940
gatgcgagaa atgtcattaa aaatggcgat ttcaataatg gcttattatg ctggaacgtg	3000
aaaggatcatg tagatgtaga agagcaaaac aaccaccgtt cggtccttgt tatcccagaa	3060
tgggaggcag aagtgtcaca agagggtcgt gtctgtccag gtcgtggcta tatccttcgt	3120
gtcacagcat ataaagaggg atatggagag ggctgcgtaa cgatccatga gatcgaagac	3180
aatacagacg aactgaaatt cagcaactgt gtagaagagg aagtatatcc aaacaacaca	3240
gtaacgtgta ataattatac tgggactcaa gaagaatatg agggtagcgt cacttctcgt	3300

aatcaaggat atgacgaagc ctatggtaat aacccttccg taccagctga ttacgcttca 3360  
gtctatgaag aaaaatcgta tacagatgga cgaagagaga atccttgtga atctaacaga 3420  
ggctatggggg attacacacc actaccggct ggttatgtaa caaaggattt agagtacttc 3480  
ccagagaccg ataaggtatg gattgagatc ggagaaacag aaggaacatt catcgtggat 3540  
agcgtggaat tactccttat ggaggaa 3567

<210> 20

<211> 762

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic sequence encoding PLRV coat protein, disclosed in  
Example 9 and set forth in lower line of Figure 16

<400> 20

agatctagag gtaattgtta tgagtactgt cgtgggtaag ggaaacgtga acgggtggtgt 60  
tcaacaacct agaaggagaa gaaggcaatc ccttcgtagg agagctaaca gagttcagcc 120  
agtgggttatg gtcactgctc ctgggcaacc aagaaggaga agaaggagaa gaggaggtaa 180  
tcgcagatca agaagaactg gagttcccag aggaagaggt tcaagcgaga cattcgtgtt 240  
tacaaaggac aacctcgtgg gcaactccca aggaagtttc accttcggac caagtgtttc 300  
agactgtcca gcattcaagg atggaatact caaggcttac catgagtaca agatcacaag 360  
tatcttgctt cagttcgtca gcgaggcctc ttccacctct ccaggctcca tcgcttatga 420  
gtagatcca cattgcaaag tttcatccct ccagtcctac gtcaacaagt tccaaatcac 480  
aaaggggtggt gctaagacct atcaagctcg tatgatcaac ggagttgaat ggcacgattc 540  
ttctgaggat cagtgcagaa tcctttggaa aggaaatgga aagtcttcag atccagctgg 600  
atctttcaga gttaccatca gagttgctct tcaaaaccca aagtaataga attcggatca 660

gagcctggtc caagcccaca accaacaccc actccaactc cccaaaagca tgagcgattt 720

attgcttacg tcggcatacc tatgctgacc attcaagaat tc 762

<210> 21

<211> 762

<212> DNA

<213> Artificial sequence

<220>

<223> Wild type PLRV coat protein coding sequence (nt 20-643),  
described in Example 9 paragraph 2, and as set forth in  
upper line of Figure 16

<400> 21

agatctagag gtaattgtta tgagtactgt cgtgggttaag ggaaacgtca acgggtggtgt 60

acaacaacct agaaggagga gaaggcaatc ccttcgcagg agggctaaca gagtacagcc 120

agtggttatg gtcactgctc ctggcgaacc caggaggagg agacgcagaa gaggaggcaa 180

tcgcaggta agaagaactg gagttcccag gggaaggggc tcaagcgaga cattcgtgtt 240

tacaaaggac aacctcgtgg gcaactcca aggaagtttc accttcggac caagtgtatc 300

agactgtcca gcattcaagg atggaatact caaggcctac catgagtaca agatcacaag 360

tatccttctt cagttcgtca gcgaggcctc ttccacctca ccaggatcca tcgcttatga 420

gttggaacca cattgcaaag tatcatccct ccagtcctac gtcaacaagt tccaaatcac 480

aaaggaggga gctaagacct atcaagctag gatgatcaac ggagtagaat ggcacgattc 540

atctgaggat cagtgcagga tacttttgaa aggaagtgga aaatcttcag acccagcagg 600

atctttcaga gtcacatca gagtggctct tcaaaacccc aagtaataga ctccggatca 660

gagcctggtc caagcccaca accaacaccc actccaactc cccaaaagca tgagcgattt 720

attgcttacg tcggcatacc tatgctgacc attcaagaat tc 762

<210> 22  
<211> 18  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK185 primer, Example 1, Table III

<400> 22  
tccccagata atatcaac

18

<210> 23  
<211> 48  
<212> DNA  
<213> Artificial sequene

<220>  
<223> BTK240 primer, Example 1, Table III

<400> 23  
ggcttgattc ctagecgaact cttcgattct ctggttgatg agctgttc

48

<210> 24  
<211> 54  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK462 primer, Example 1, Table III

<400> 24  
caaaactgag aggtggaggt tggcagcttg aacgtacacg gagaggagag gaac

54

<210> 25  
<211> 48  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK669 primer, Example 1, Table III

<400> 25  
agttagtgtgta agctctctcttc tgaactgggtt gtacctgata caatctct 48

<210> 26  
<211> 39  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK930 primer, Example 1, Table III

<400> 26  
agccatgatac tggtagaccgg accagtagta ttctcctct 39

<210> 27  
<211> 32  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK1110 primer, Example 1, Table III

<400> 27  
agttgttggt tggtagatccc gatgttaaaa gg 32

<210> 28  
<211> 37  
<212> DNA  
<213> Artificial sequence

<220>  
<223> BTK1380A primer, Example 1, Table III

<400> 28  
gtgatgaagg gatgatgttg ttgaactcag cactacg 37

<210> 29  
<211> 100  
<212> DNA



<213> Artificial sequence

<220>

<223> BTK1380T primer, Example 1, Table III

<400> 29

cagaagttcc agagccaaga ttagtagact tggtagtggt gatttgggtg atttgtgatg 60

aagggatgat gttgttgaac tcagcactac gatgtatcca 100

<210> 30

<211> 27

<212> DNA

<213> Artificial sequence

<220>

<223> BTK1600 primer, Example 1, Table III

<400> 30

tgatgtgtgg aactgaaggt ttgtggt 27

<210> 31

<211> 51

<212> DNA

<213> Artificial sequence

<220>

<223> BTK1363 primer, Example 3, Table VI

<400> 31

aatactatcg gatgcgatga tgttgttgaa ctcagcacta cgggtgatcc a 51

<210> 32

<211> 33

<212> DNA

<213> Artificial sequence

<220>

<223> 73K1437 primer, Example 3, Table VI

<400> 32  
tcctgaaatg acagaaccgt tgaagagaaa gtt 33

<210> 33  
<211> 48  
<212> DNA  
<213> Artificial sequence

<220>  
<223> 73K1471 primer, Example 3, Table VI

<400> 33  
atttcactg ctgttgagtc taacgaggtc tccaccagtg aatcctgg 48

<210> 34  
<211> 61  
<212> DNA  
<213> Artificial sequence

<220>  
<223> 73K1561 primer, Example 3, Table VI

<400> 34  
gtgaataggg gtcacagaag catacctcac acgaactcta tatctggtag atgttg gatg 60

g 61

<210> 35  
<211> 33  
<212> DNA  
<213> Artificial sequence

<220>  
<223> 73K1642 primer, Example 3, Table VI

<400> 35  
tgtagctgga actgtattgg agaagatgga tga 33

<210> 36

<211> 48  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> 73K1675 primer, Example 3, Table VI  
  
 <400> 36  
 ttcaaagtaa ccgaaatcgc tggattggag attatccaag gaggtagc 48

<210> 37  
 <211> 39  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> 73K1741 primer, Example 3, Table VI  
  
 <400> 37  
 actaaagttt ctaacaccca cgatgttacc gagtgaaga 39

<210> 38  
 <211> 36  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> 73K1797 primer, Example 3, Table VI  
  
 <400> 38  
 aactggaatg aactcgaatc tgtcgataat cactcc 36

<210> 39  
 <211> 54  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> 73KTERM primer, Example 3, Table VI

<400> 39

ggacactaga tcttagtgat aatcggtcac atttgtcttg agtccaagct gggt

54

<210> 40

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> RUBISCO SSU CTP cleavage site sequence, described in Example 10

<400> 40

Gly Gly Arg Val Asn Cys Met Gln Ala Met

1

5

10